

CLAIMS

1. A composite material member comprising:
a main material composed of a light metal or a light metal alloy which can be molded by casting; and
a secondary material composed of a metallic material different from the main material or an inorganic material, the secondary material being joined to the main material by integrally casting with the main material,
wherein a porous material is arranged on a part of a boundary area or an entire boundary area between the main material and the secondary material.
2. The composite material member according to claim 1, wherein the light metal is aluminum or magnesium, and the light metal alloy is an alloy including at least one of aluminum and magnesium.
3. The composite material member according to claim 1 or 2, wherein the secondary material is cast iron, iron steel, stainless steel, Fe-Cr-based alloy, or Ni-based alloy.
4. The composite material member according to one of claims 1 to 3, wherein the porous material is composed of a metal fiber and a foamed metal by which a diffusion joining can be performed with the secondary material.
5. The composite material member according to claim 4, wherein the metal fiber is

laminated randomly or in an oriented condition to yield a three-dimensional structure.

6. The composite material member according to claim 4, wherein the porous material is a whisker aggregate.

7. The composite material member according to one of claims 4 to 6, wherein the metal fiber and the whisker have a wire diameter of from a few micrometers to a few millimeters, and the metal fiber and the whisker have a grain size of from a few micrometers to a few millimeters.

8. The composite material member according to claim 7, wherein the metal fiber and the whisker have a wire diameter of from a few micrometers to 100 micrometers, and the metal fiber and the whisker have a grain size of from a few micrometers to 100 micrometers.

9. The composite material member according to one of claims 1 to 8, wherein the porous material has a volume rate of from 30 to 60% when a plate thickness in a direction spaced from the secondary material is not less than 1 mm and less than 2 mm, and the porous material has a volume rate of from 20 to 60% when a plate thickness in a direction spaced from the secondary material is not less than 2.

10. The composite material member according to one of claims 1 to 8, wherein the porous material has a volume rate in a part spaced from the secondary material smaller

than that in a part close by the secondary material.

11. The composite material member according to claim 10, wherein the volume rate of the porous material is ranged at 20 to 70% when the plate thickness is not less than 1 mm.

12. A method for producing a composite material member comprising the steps of :
preparing a main material composed of a light metal or a light metal alloy which can be molded by casting, and a secondary material composed of a metallic material different from the main material or an inorganic material; and

joining the secondary material to the main material by integrally casting the materials;

wherein a porous material is contacted with the secondary material, the porous material and the secondary material are compressed at a predetermined volume rate and sintered in the contacted condition to join them by diffusion and obtaining a compact, and the compact is joined to the main material by integrally casting them.

13. A method for producing a composite material member comprising the steps of :
preparing a main material composed of a light metal or a light metal alloy which can be molded by casting, and a secondary material composed of a metallic material different from the main material or an inorganic material; and

joining the secondary material to the main material by integrally casting the materials;

wherein a porous material composed of a fiber is preliminarily compressed at a predetermined volume rate, the compressed fiber and the secondary material are sintered, thereby joining them by diffusion and obtaining a compact, and the compact is joined to the main material by integrally casting them.